Pag. 181 25X1

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The overall trend of all metallurgical research was to seek methods to increase and improve the quality of production and to decrease costs of both production and goods manufactured.

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[redacted] the supply of all metals and non-metals was, and probably still is, critically short. The shortage was keenly felt in goods for civilian needs, such as metal products for housing, etc. Bronze and brass products were unobtainable. In industry, various items needed by metallurgical and construction plants were critically short, especially scrap iron. This was mainly due to the poor transportation system and the lack of coordination in development of the extracting, processing and consuming branches of industry. 25X1

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The following methods were employed:

(a) The chemical composition was determined by quantitative and qualitative analysis in so-called express laboratories (accelerated method), by thermal analysis, spectrum analysis, and by the analysis of waste gases and the qualitative analysis of raw materials.

(b) During the process of production, technological tests included tests for ductility of the metal after molding, tests for bending, granularity, etc. The following tests were applied to compound

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25 YEAR RE-REVIEW

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metals: strength, compression, expansion, Brinell and Rockwell hardness, pile-driver, micro and macro analyses, X-ray, twisting or torsion, material fatigue, corrosion, etc.

(c) The production of materials is strictly standardized and each standard or technological instruction provides for methods of control necessary for the achievement of the required quality of materials.

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The status was satisfactory insofar as raw material resources were concerned since resources are unlimited. The difficulty was again in poor transportation coordination as well as lack of proper coordination between allied industries.

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The "high speed smelting" technique, which increases production, is a probability. This method consists mainly of reducing the time required for such processes of the Martin furnace which do not affect the quality of the steel, as

(a) the time required for loading the furnace
(b) the time required for letting out the steel
(c) the time required for setting the furnace
(d) the time required for melting the furnace charge.

Temperature conditions are strictly observed. At the same time the period needed for the refining of the metal remains the same, in compliance with the technological instructions.

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the Martin furnaces had been operating at maximum high temperatures. This required reinforcement of the fireproof laying and brick lining of the furnace and recuperators. It also required the use of more control instruments and of better qualified and more attentive personnel.

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To begin with, productivity of the Soviet worker is much lower than that of workers in other countries. This is due mainly to the fact that in the Soviet there are so many people engaged in non-productive work, such as political, administrative, economic, etc. The overall output per man hour is, therefore, low. On occasions, however, the set norms are reached. Generally, technicians are well trained and efficient.

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the data pertaining to the output from one square meter of furnace floor can be found in Soviet publications available in the US. It occurs to me that the figures published some time ago indicated that Soviet output per man were smaller than those of other countries, with a few exceptions.

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Such problems are usually minor ones and are solved during the so-called "starting period". When Soviet purchasing agents buy foreign equipment they always make stipulations for the delivery of one or more complete sets of spare parts and equipment (tools and machines) required for repair and maintainance. Quite often the foreign firms were required to provide their own specialists to supervise the installation of the machines and equipment. After the inevitable difficulties encountered during the

25X1

initial or "starting" period of the exploitation of the new equipment or machine, production processes were mastered very quickly.

25X1

It required from three to six months for construction of a blast or open hearth furnace. The changing of the brick lining of a complete Martin furnace took from one to two weeks. A furnace crown can withstand approximately 30 to 50 smeltings. A capital repair job (changing the crown and repair of furnace walls) required three to four days.

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Prior to 1940, officially published statistical data on the production of iron and steel were relatively correct. It must be borne in mind that Soviet statistics are published for scientific and political propaganda purposes and if the purpose of the publication is known, then the validity of the statistics can be adjudged. scientific publications within the USSR were fairly accurate.

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SUMMARY

10. unable to comment on any new developments in metallurgical research inasmuch as Soviet scientific publications in this field have not been available. From occasional articles in newspapers and from my past experience new developments have been taking place right along. There have been increases in norms, new types of steel have been found, new methods of research have, therefore, been put into practice. In general, the organization and methods of research in the past were excellent; funds allocated for this purpose were unlimited. The institutions and individuals conducting research were quite satisfactory and the quality of completed work was good. The Academy of Sciences and its allied institutes, special research institutes and other organizations conducting secret work under the NKVD had well qualified personnel. The bulk of long range research was classified All positive results of research were tried at special testing plants, such as blast furnaces, rolling mills, etc. Some of these units were specially built for continuous rolling process (skipping the ingot smelting phase).

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11. Weak points in Soviet metal industries were the low productivity, a low quality of production (there was a high percentage of spoiled products), and the poor utilization of plants and equipment. One should bear in mind, however, that Soviet metallurgical industries are young and have had little experience in terms of time but despite this, according to all indications, they have progressed rapidly.

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